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A conjecture about an under-Current at the Streights-Mouth, read before the Oxford Society, Dec. 21. 1583. by the reverend and learned Tho. Smith D. D. Fellow of Mag. Col. Oxon. and of the R. Society.

IN the *Offing* between the *North Foreland* and *South Foreland* it runs *Tide* and *half Tide*, that is, it is either *ebb*ing water or *flood* upon the shore, in that part of the *Downs*, three hours, which is grossly speaking the time of *half a tide*, before it is so, off at sea. (For the *flux* and *reflux* of the sea is not made exactly twice in 24 hours, but, as it appears by accurate observation, it requires an overplus of almost 50 minutes.) The reason of this diversity of *tides*, I take to be from the meeting of the two *seas* in that narrow *streight*.

Oftentimes when the *wind* has blown hard at N.E. or at W. or W. and by S. there has hapn'd an alteration of the *tides* in the *river of Thames*, which ignorant people have mistakingly lookt upon as a *prodigy*.

It is a most certain *Observation*, that where it flows *tide* and *half tide*, tho' the *tide* of *flood* runs aloft, yet the *tide* of *ebb* runs *under foot*, that is, close by the *ground*; and so at the *tide* of *ebb*, it will *flow* *under foot*, as that great and experienc'd *Sea-Commander*, ^a Sr. *Henry Mainwaring* words it. Upon this supposition I shall humbly offer a *conjectur* to this learned *Society* concerning the *Mediterranean Sea*, after I have premised this brief *history* of it, as containing certain matter of fact.

There is a vast *draught* of *water* poured continually out of the *Atlanick* into the *Mediterranean*, the mouth or entrance of which between *Cape Spartel* or *Sprat*, as the *Spanier* call it, and *Cape Trafalgar*, may be near 7 leagues wide, the *current* setting strong into it, and not loosing its force till it runs as far as *Malas*¹, which is about 20 leagues within the *Streight*. By the benefit of this *current*, tho' the *wind* be contrary, if it does not over-blow, *Ships* easily turn into the *gut*, as they term the *narrow passage*, which is about 20 miles in length. At the end of which are two Towns, *Gibraltar* on the

(a) *Seamans diction* p. 106.

coast of Spain, which gives denomination to the Streight, and Cuta on the Barbary coast: at which places Hercules is supposed to have set up his pillars. What becomes of this great quantity of water poured in this way, and of that, which runs from the Euxim into the Bafforus and Propontis, and is carried at last through the Hellespont into the Agaan or Archipelago, is a curious *speculation*, and has exercised the wit and understanding of Philosophers and Navigators. For there is no sensible rising of the water all along the Barbary Coast, even down to Alexandria, the land beyond Tripoli, and that of Egypt, lying very low, and easily overflowable. They observe indeed, that the water rises 3 feet, or 3 feet and an half, in the *gulph* of Venice, and as much, or very near as much, all along the Riviera of Genoua, as far as the river Arno: but this rather adds to the wonder.

I here omit to speak at large of the several *hypotheses*, which have been invented to solve this difficulty: such as *subterraneus vase*, cavitys and indraughts, *exhalations* by the *Sun beam*: the running out of the water on the *African side*, as if there were a kind of circular motion of the water, and that it only flowed in upon the *Christian* shore: which latter I look upon as a meer fansy, and contrary to all observation.

My conjecture is, that there is an *under-current*, whereby as great a quantity of water is carried out, as comes flowing in. To confirm which, besides what I have said above about the difference of tides in the *offing*, and at the *Shore* in the *Downs*, which necessarily supposes an *under Current*, I shall present you with an instance of the like nature in the *Baltick Sound*, as I received it from an able seaman, who was at the making of the tryal.

He told me, that being there in one of the King's Fregats, they went with their *Armace* into the *middle strait*, and were carried violently by the *Current*: that soon after they sank a *bucket* with a large *Cannan* bullet to a certain $\frac{1}{4}$ of water, which gave check to the boats motion, and sinking it still lower and lower, the *boat* was driven a head to wind-ward against the upper *Current*: the *current* aloft, as he added, not being above 4 or 5 fathoms deep, and that the lower the *bucket* was let fall, they found the *under-Current* the stronger. I designed

designed to have made the *Experiment* in the *Straits-Channel* ; but both times I past, the Easterly wind blew so hard, that there was no putting out the boat with any safety ; nor indeed at those times had we any leisure for such a *Curiosity* ; which those, who lived at *Tanger*, might have tryed without any difficulty or danger.

This conjecture, how likely or unlikely soever, will stand or fall according to the certainty of the *Observations*, which shall be made there, which I will endeavour to procure in order to the further establishment, or utter overthrow of it.
